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**WORK PLAN  
ON-SITE SOIL PREPARATION  
Draft Revision C**

**LIBBY ASBESTOS SITE – OPERABLE UNIT 7  
TROY, MONTANA**

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## Acronym List

COC	Chain of Custody
CRZ	Contamination Reduction Zone
EPA	Environmental Protection Agency
ESAT	Environmental Services Assistance Team
HEPA	High Efficiency Particulate Air
IDW	Investigation-derived Wastes
MT-DEQ	Montana Department of Environmental Quality
PPE	Personal Protective Equipment
QA	Quality Assurance
QC	Quality Control
R8	Region 8
SAP	Sampling and Analysis Plan
SOP	Standard Operating Procedure
SPF	Sample Preparation Facility
SZ	Support Zone
TAPE	Troy Asbestos Property Evaluation
WZ	Work Zone

## 1.0 INTRODUCTION

The EPA Region 8's Environmental Services Assistance Team (ESAT) will prepare soil samples for analysis on-site in Troy, Montana, during the 2007 field season. This document serves as the work plan for these activities. Its purpose is to:

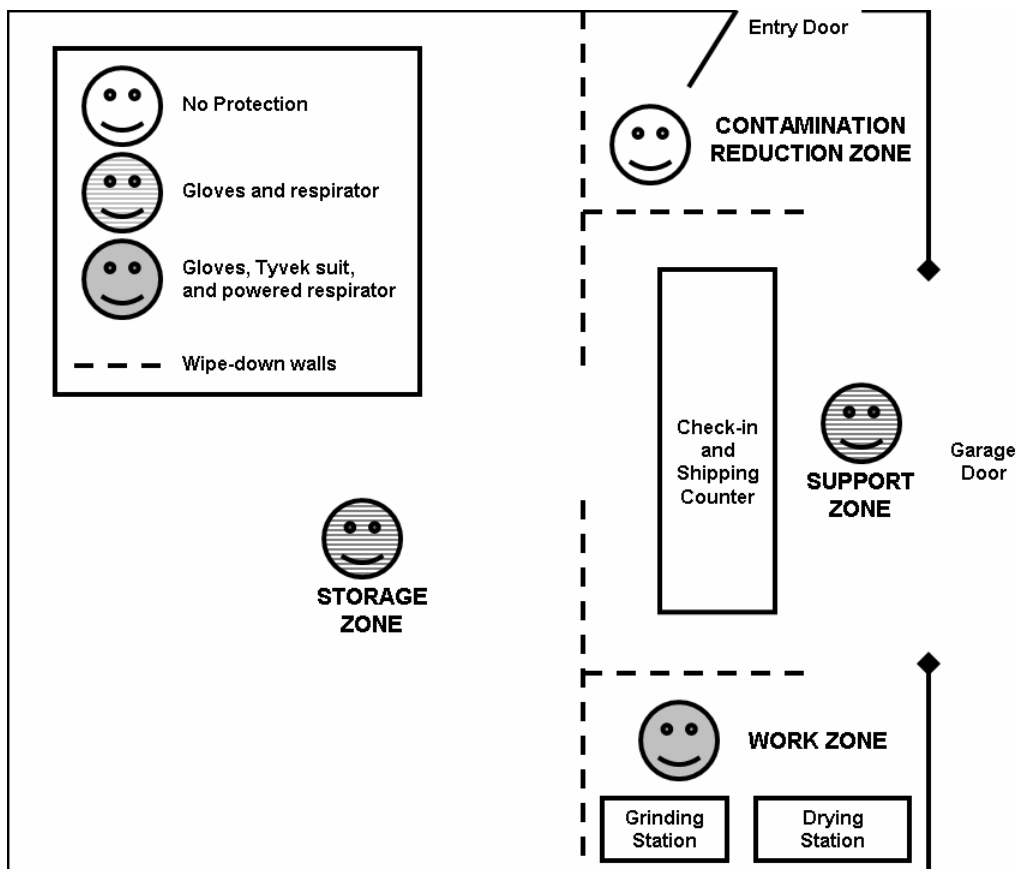
1. Eliminate cross-contamination and worker exposure.
2. Ensure that all preparation processes and measurements are scientifically sound and of known, acceptable, and documented quality.

All requirements and activities described in the Troy Asbestos Property Evaluation (TAPE) Sampling and Analysis Plan (SAP) still apply.

## 2.0 FACILITY

The Sample Preparation Facility (SPF) will be located in Troy, MT and will be housed in a former ambulance barn that is currently vacant. MT-DEQ will arrange to provide this facility and all utilities free of charge.

**Figure 1: Design of the Sample Preparation Facility**



**Support Zone** – This space will be used to check samples in and package samples for archival or shipment to appropriate laboratories.

**Contamination Reduction Zone** – This space will be adjacent to the Support Zone and use for the donning and doffing of personal protective equipment. All activities in this space will be performed as discussed in the Health and Safety Plan (Appendix H).

**Work Zone** – This space will be adjacent to the Support Zone and will include a drying station and a grinding station. All activities in this space will be performed as discussed in the Health and Safety Plan (Appendix H). No personnel will be admitted into the Work Zone without the appropriate personal protective equipment.

**Storage Zone** – This space will be adjacent to the Support Zone and used to store prepared samples for shipment or archival. All activities in this space will be performed as discussed in the Health and Safety Plan (Appendix H).

### 3 EQUIPMENT

- General purpose laboratory oven - must be capable of maintaining a constant temperature of approximately 89-91 degrees C.
- Fume hood – will be under negative pressure and vented through high efficiency particulate air (HEPA) filter units designed to remove particles less than .3 microns in diameter.
- HEPA filtered vacuum
- Analytical balance - calibrated and accurate to tolerance limits indicated on Attachment 2, range of 0.1 g to at least 2000 g
- Riffle splitter - with 3/4 inch chutes to split samples
- Plate Grinder - capable of accepting soil particles of approximately 1/4 inch diameter and grinding to produce particle of approximately 250 :m
- Metal (other than plastic) scoop or spoon - for transferring samples
- 1/4 inch metal (other than plastic) sieve and catch pan - for coarse sieving samples
- 60 mesh (250 :m) and 200 mesh (74 :m) metal (other than plastic) sieves - for verification of the plate grinder settings
- Clean quartz sand - required for preparation of grinding and drying blank samples (Sections 6.2, 9.2, 12.1 and 12.3) and for decontamination of grinder (Section 9.4)
- Clean soil - sufficient aliquot required for calibration of grinder (Section 9.1)
- Drying Pans with Lids - pans used during the sample drying process, lids used to cover samples during transfer
- Sample containers - plastic ziplock bags (pint and gallon size)
- Gloves - for personal protection and to prevent cross-contamination of samples. May be plastic or latex. Disposable, powderless
- Field clothing and Personal Protective Equipment - as specified in the Health and Safety Plan (Appendix E of the CSF SPP, December 2003)
- Field notebook -used to record progress, any problems or observations and deviations
- Sample Drying Log Sheets - (Attachment 1) - used to record all sample drying information
- Sample Preparation Log Sheets (Attachment 1)- used to record all sample preparation information (splitting, sieving and grinding)

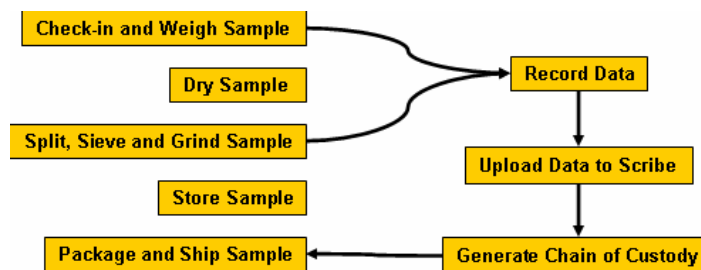
➤ Three-ring binder books - binders will contain:

- Analytical Balance Calibration and Maintenance Log
- Grinder Calibration and Maintenance Log
- Ventilation Hood Calibration and Maintenance Log
- Vacuum Maintenance Log
- Oven Temperature Calibration and Maintenance Log
- Sample labels

## 4 PROCEDURES

All sample preparation procedures will follow the Standard Operating Procedure (SOP), for Soil Sample Preparation provided in Appendix A. These procedures are designed to produce a sample for asbestos analysis with well-homogenized material of a relatively standard particle size. The following subsections may also reference other EPA and/or ESAT SOPs.

**Figure 2: General Sample Preparation Procedures**



**Check-in and Weigh Sample:** At the beginning of each sample preparation period, ESAT will check-in samples that have been collected by TetraTech field personnel. The sample identification numbers and weight of all of the samples will be entered into an electronic soil preparation tracking form and used to verify the sample metadata exists in the Scribe Sampling Project. If the sample metadata does not exist or the identification number indicates the sample has already been processed, ESAT will notify the EPA Work Assignment Manager and the MT-DEQ Project Manager.

**Dry Sample:** Samples will be moved to the ventilation hood, homogenized as much as possible in the bag, transferred to drying pans, covered, moved to an oven, uncovered, and dried.

**Split, Sieve and Grind Sample:** First, the sample will be split and approximately half will be archived. The sub-sample NOT archived will again be split in half if a duplicate is required, and the duplicate aliquot will follow the same procedures as the original portion. If no duplicate is required, the total sample will be sieved, and the coarse fraction will be contained for analysis (with a suffix label of labeled “C” for coarse). The finer fraction will then be ground and split into four sub-samples (with a suffix of either labeled “FG1,” “FG2,” “FG3,” and “FG4”). Three of the subsamples will be archived and the subsample labeled “FG1” will be sent for analysis. If further analyses are required for the fine ground portion, the subsequent aliquot will be sent (i.e., FG2, then FG3, etc.).

**Store Sample:** Whenever samples are not being processed, they will be stored in plastic totes or shipping coolers. All totes will be labeled with an inventory batch number and all coolers will be labeled with a Chain of

Custody ID. The totes will be arranged by inventory batch number for easy retrieval. The samples do not require refrigeration but must be kept in an orderly, clean fashion.

**Package and Ship Sample:** All samples will be packaged and shipped in accordance with the Packaging and Shipping of Environmental Samples SOP (Appendix B). Custody will also be tracked by following the Sample Custody SOP (Appendix C) with Chains of Custody forms (Appendix D) being generated by Scribe.

**Record Data:** The oven temperatures and sample masses will be collected and recorded on the sample preparation form as indicated in the Soil Preparation SOP (Appendix A). Measurement data requirements related to for laboratory environmental and health and safety exposure monitoring are included in the Health and Safety Plan for this project (Appendix E). Additional required QA/QC documentation is described in Section 5.

**Decontamination:** All equipment will be decontaminated prior to use in accordance with the Sample Preparation SOP (Appendix A). This decontamination will be conducted after and/or before each sample is in direct contact with any piece of equipment.

**Investigation-Derived Waste Disposal:** Investigation-derived waste (IDW) consists of PPE, (i.e., tyvek and respirator filters), HEPA filters (i.e., hood and vacuum), and decontamination waste (i.e., excess sample and silica sand vacuumed from the hood and around the SPF during decontamination). The PPE and filters will be collected after each use and stored in plastic bags (e.g., trash bags) until disposal. The decontamination waste will be stored in lidded buckets until disposal. All IDW will be double-contained and disposed of as municipal waste.

**Table 3.4-1 Suffix Identification Codes and Description**

Code	Description
C	Coarse - sample fraction that does not pass through a 1/4 -inch sieve
B	Bulk - sample fraction that passes through a 3/8-inch sieve, but is not ground
F	Fine - sample fraction that passes through a 1/4 -inch sieve
FG	Fine Ground - sample fraction that passes through a 1/4 -inch sieve and is ground to approximately 250 um
FGS	Fine Ground Sieve- sample fraction that passes through a 3/8 -inch sieve and is ground to approximately 250 um
ACA	Archive Coarse - the archived portion of the coarse fraction
ABA	Archive Bulk - the archived portion of the bulk fraction
AFA	Archive Fine - the archived portion of the fine fraction
AFGA	Archive Fine Ground - the archived portion of the fine ground fraction



AFGS	Archive Fine Ground Sample - the archived portion of the fine ground sample fraction
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## **5 QUALITY ASSURANCE/QUALITY CONTROL**

This section details the internal QA/QC samples, equipment calibration, QA/QC checks, audits/corrective actions, and training requirements.

During each deployment, a daily Quality Assurance (QA) checklist as provided in Appendix A will be completed. If any deficiencies are noted in a daily QA checklist, the EPA Region 8 ESAT Project Officer and MT-DEQ Project Manager will be notified and corrective action will then be determined by all parties. If the possible, the corrective action will be immediately implemented. If the corrective action cannot or is not immediately implemented, then an improvement plan will be issued. If the actions included in the improvement plan are not completed by the due date on the plan, the EPA Region 8 ESAT Project Officer and MT-DEQ Project Manager will try to resolve the issue. If the deficiency cannot be resolved within a week after the improvement plan due date, a corrective action will be taken.

In addition to the daily QA checklists, EPA/ESAT will deliver a Progress and Quality Assurance Report to the Montana Department of Environmental Quality (MT-DEQ) at the end of each deployment. These reports will include: 1) the number of samples that have been checked-in, prepared for analysis, and shipped to appropriate laboratories and 2) copies of all daily QA checklists generated during that deployment.

### **5.1 Quality Assurance/Quality Control Samples**

Two types of QA/QC samples will be collected during the preparation process: preparation duplicates and preparation blank samples, each of which will be discussed below.

#### **5.1.1 Preparation Duplicate Samples**

Preparation duplicate samples are splits of samples submitted for sample preparation after drying but prior to sieving. These samples serve to evaluate the precision of both the sample preparation process and the laboratory analysis. One preparation duplicate sample will be processed for every 20 field samples prepared. The preparation duplicate samples are given sample identification numbers provided by sample coordination personnel. For each preparation duplicate prepared, a field sample data sheet (FSDS) (Appendix E) is completed as detailed in the TAPE SAP.

#### **5.1.2 Preparation Blank Samples**

Preparation blank samples are prepared to determine if decontamination procedures of laboratory equipment used to prepare asbestos samples are adequate to prevent cross-contamination of samples during sample preparation. The preparation blank consists of clean quartz sand. At least one preparation blank will be processed with each batch of field samples. A batch of samples is a group of samples that have been prepared together for analysis at the same time (approximately 120). The preparation blank samples are given sample identification numbers provided by sample coordination personnel. For each preparation blank prepared, an FSDS (Appendix E) is completed as detailed in the TAPE SAP.

### **5.2 Equipment Calibration**

Instrumentation requiring calibration or routine function checks include sample grinders, drying ovens, ventilation hood (HEPA filter and velocity), HEPA vacuum, and the analytical balance. Table 5.2-1 summarizes the calibration procedures, frequency, and location of documentation for each piece of equipment. The following sections include a detailed description of each of the calibration procedures.

**Table 5.2-1 Calibration Summary Table**

<b>Instrument</b>	<b>Frequency</b>	<b>Where Documented</b>
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Grinder	Daily or every time plate depth is adjusted	Grinder calibration and maintenance log
Drying Oven	Weekly	Oven temperature calibration and maintenance log
Ventilation Hood	Daily	Ventilation hood log
HEPA Vacuum	As needed	Vacuum maintenance log
Analytical Balance	Daily	Balance maintenance log

### **5.2.1 Grinder Calibration**

The vertical plate grinder will be calibrated every day it is used and every time the disk depth is adjusted to verify target particle size. Approximately 50 to 100 grams (g) of clean quartz sand are processed through the grinder. The ground sand is then passed through a 60-mesh and a 200-mesh sieve. Calibration is successful when all of the ground sand passes through the 60-mesh sieve and some portion of the ground sand is retained on the 200-mesh sieve. Grinder calibration is documented in the SPF logbook and on the grinder calibration and maintenance log (Soil Preparation SOP, Appendix B).

### **5.2.2 Drying Oven Calibration/Check**

The drying oven calibration is checked once per week by setting the temperature control to 90<sup>0</sup>C and letting the oven come up to the set temperature. A thermometer is placed in the oven and the temperature is recorded. The acceptable criteria is +/- 1<sup>0</sup>C. If the calibration fails, repairs are made to the oven until recalibration of the oven is in agreement with acceptable criteria. All oven calibration will be documented in the SPF logbook and on the oven temperature calibration and maintenance log (Soil Preparation SOP, Appendix B).

### **5.2.3 Ventilation Hood Operating Condition Verification**

Two calibration checks will be conducted on the ventilation hood. One will be a check of the hood's HEPA filter, and the second will be a check of the negative flow velocity.

The ventilation hood HEPA filter has an indicator light located on the front panel that identifies whether the filter needs to be changed. This panel will be checked daily to ensure that the HEPA filter is operating correctly. If the filter change light is on, the filter will be changed before any operations proceed in the hood. All ventilation hood operating condition verification checks and maintenance will be documented in the SPF logbook and the ventilation hood operating condition verification and maintenance log (Soil Preparation SOP, Appendix B).

The velocity of the negative flow HEPA hood will be checked with a flow meter/anemometer daily. The minimum allowable velocity in the negative flow HEPA hood will be 100 feet per minute. A line will be drawn on the hood sash frame indicating the sash location where the minimum velocity is observed. The sash will not be opened further than this point, and during grinding operations, the sash will be lowered to increase the flow velocity.

### **5.2.4 HEPA Vacuum Filter Check**

The HEPA vacuum used to decontaminate the grinder, splitter, sieves, pans, and other decontamination areas will be checked daily for correct operations. Replacement of either the bag or filter will be performed in the hood. All vacuum checks and maintenance will be documented in the SPF logbook and the vacuum maintenance log (Soil Preparation SOP, Appendix B).

### **5.2.5 Analytical Balance Calibration Check**

The calibration of the balance used to weigh samples will be checked daily. Class-S weights will be used to verify the internal calibration at 0.1g, 1g, 10g, and 100g. Tolerance limits for the calibration check are +/- 0.1 g. If the balance fails the calibration check, the balance will be re-calibrated. All analytical balance calibration checks and maintenance will be documented in the SPF logbook and the analytical balance calibration and maintenance log (Soil Preparation SOP, Appendix B).

### **5.3 Laboratory Housekeeping**

The following housekeeping measures will be put in place to help ensure a safe and clean working environment. These measures are discussed further within Attachment 1 of the SPF HASP (Appendix H).

- The walls and counter top of the negative flow HEPA hood will be wet wiped and HEPA vacuumed after the completion of each day.
- Sticky mats will be placed in the doorways of the Work Zone, Contamination Reduction Zone, Support Zone and the Archival Zone to reduce the volume of material brought into the laboratory from the outside. Additionally, sticky mats will reduce the potential to track materials throughout the laboratory.
- Areas of sample handling and preparation, including floors, will be HEPA vacuumed and wet wiped at the end of each day.
- The sample drying ovens will be HEPA vacuumed and wet wiped after each batch of samples.

### **5.4 Quality Assurance/Quality Control Checks**

A series of QA/QC checks will be used to ensure data are accurate and recorded according to the procedures of this Work Plan and the Soil Sample Preparation SOP.

#### **5.4.1 Sample Receipt and Check-In**

At the beginning of each sample preparation period, stored samples will be checked in by two different people to verify the sample identification labels match the data that was collected and uploaded to Scribe. If there are any discrepancies, the EPA Region 8 ESAT Project Officer and MT-DEQ Project Manager will be notified, and the discrepancy will be corrected.

#### **5.4.2 Sample Drying and Sieving**

Once each day an EPA/ESAT member other than the sample preparer must check the sample preparation form to ensure all entries are complete and correct. The reviewer will initial and date the sample preparation forms after review. If any entries are not complete or correct, the person originally filling out the form will correct the form and then be retrained so that future mistakes are not made.

#### **5.4.3 Sample Packaging and Shipping**

For every sample shipment from the SPF, a second person will check the prepared COC form against the shipment contents to ensure all samples in the shipment appear on the COC form (and vice versa), all sample labels ( both inside and outside bags) are correct, and there are no duplicate or missing labels. The reviewer will initial and date the COC forms after review. If there are any discrepancies, the person who originally packaged the cooler for shipment will be retrained so as to reduce the potential for future mistakes.

#### **5.4.4 Sample Preparation Facility Calibration and Maintenance**

A second person, other than the person that performed the equipment calibration and/or maintenance, must check the calibration and/or maintenance log sheets at some point during the daily operations to ensure the logs and calibration procedures were completed. The reviewer will initial and date the log sheets after review. If it is noted that the logsheets or calibration procedures have not been completed, the person who originally conducted the calibration will be retrained so that the logbooks and calibration procedures will be completed and correct in the future.

#### **5.4.5 Documentation**

This section describes the QA/QC of SPF documentation and procedures for making corrections to the SPF documentation.

##### **Logbooks**

Details regarding each sample preparation step will be recorded in the laboratory logbook in accordance with the Sample Preparation SOP (Appendix B). The log is an accounting of activities and will duly note problems or deviations from the governing plans and observations relating to the soil preparation activities. Information that is already recorded in log sheets (i.e., grinder calibration log, ventilation hood log, etc.) does not need to be duplicated in the log book, however daily activities performed should be included. Upon issuance of a logbook, the logbook will be given a document control number. Logbook pages will be copied at the end of each sample preparation period and turned over to the EPA. Upon completion of the logbook, it will be relinquished to the EPA. Details about what information should be recorded in the logbook are included in the above SOP. A person other than the one who completed the entries will check logbook entries at the end of each day. The logbook checks will ensure all relevant information has been recorded. If any logbook entries are incorrect or incomplete, the person originally entering the information into the logbook will be retrained so that future logbook entries are complete and correct.

##### **Chain of Custody Requirements**

COC procedures will follow the requirements stated in the Sample Custody SOP (Appendix D). The COC record is used as physical evidence of sample custody and control. This record system provides the means to identify, track, and monitor each individual sample from the point of collection through final data reporting. A complete COC record is required to accompany each shipment of samples. Upon receipt and prior to the shipment of samples, the COC should be checked against the contents of the cooler as detailed above. An example of the COC used at the SPF is provided in Appendix F.

##### **Electronic Troy Asbestos Sample Tracking Information Center**

The Scribe database will be used to track various pieces of information during the sample preparation process. EPA/ESAT personnel other than the person who completed the data entry will check 100% percent of the data entered into Scribe on a weekly basis.

##### **Forms**

FSDS, preparation log sheets, and calibration and maintenance logs must be completed in accordance with the Soil Sample Preparation SOP (Appendix A). When these sheets have been completed, ESAT personnel, other than the person who completed the sheet, will check to ensure the data are accurate and complete as detailed above.

##### **Sample Labeling**

As described in the Soil Sample Preparation SOP (Appendix B), suffixes are added to sample identification numbers to indicate bulk fraction, coarse fraction, fine fraction, fine, ground fraction, and the archived portion of each of these fractions. Table 3.4-1 presents the suffix identification codes and descriptions.

In addition to labeling individual samples, storage boxes are also labeled as described in the Sample Preparation SOP (Appendix B). Prior to shipment, if a sample is shipped immediately after preparation, or prior to storage of a sample, EPA/ESAT personnel will check each sample aliquot to determine if the suffix of the sample identification number corresponds to the sample appearance. The reviewer will initial and date the label after review. If it has been identified that a portion of the sample does not correlate with the aliquot associated with the label, the label will be corrected. It will also be determined why this discrepancy occurred and actions will be taken so that it will not happen in the future.

### **Correction to and Deviations from Documentation**

For the logbook modifications, a single strikeout initial and date is required for documentation changes. The correct information should be entered in close proximity to the erroneous entry. These procedures will also be followed for corrections to any form (FSDS, log sheets, and COCs). All deviations from the guidance documents will be recorded in the logbooks and the Libby Asbestos Project Record of Deviation/Request for Modification Form (MOD) (Appendix G). All MOD forms are to be completed, approved and recorded following the Approval of the MT-DEQ Project Manager and the EPA ESAT Project Officer.

#### ***5.4.6 Quality Assurance/Quality Control Check Corrective Actions***

Immediate actions will be taken to correct any findings during the daily QA/QC checks, if applicable. If immediate action is not applicable, an implementation plan must be completed and approved by the ESAT Project Officer, EPA, and MT-DEQ. If corrective action is immediate, the action will be documented in the SPF logbook, and the ESAT Project Officer, EPA, and MT-DEQ will be notified of the corrective action within 3 days.

### **5.5 Audits and Corrective Actions**

An internal audit will be performed during the initial implementation of this Work Plan. If findings of this audit show the procedures of this Work Plan are not being implemented (i.e., many deficiencies are identified), an additional audit may be conducted within one week of the initial audit. An additional audit will be performed when samples are being prepared on a large scale (i.e., during full-time operation of the SPF for preparation and full-time analysis). If significant procedural changes occur during the study, additional field audits may be conducted to ensure the new methods are implemented and followed appropriately. Audit reports will be completed following each audit and will be provided to EPA, upon request. Response actions may be implemented to correct quality problems as detailed above. All corrective actions will be documented in accordance with this Work Plan.

### **5.6 Training Requirements**

Personnel performing sample preparation activities must have read and understood this Work Plan, the SPF health and safety plan, and all associated SOPs. In addition, personnel must have completed 40-hour Occupational Safety and Health Administration (OSHA) hazardous waste operations training and annual updates, as required. Additional training may be identified prior to project implementation and will be administered prior to any individual beginning work at the SPF.